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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/484,437	01/18/2000	Tongbi Jiang	M4065.0226/P226	9698
24998	7590	09/20/2006	EXAMINER	
DICKSTEIN SHAPIRO LLP 1825 EYE STREET NW Washington, DC 20006-5403			MITCHELL, JAMES M	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/484,437		JIANG, TONGBI	
	<b>Examiner</b>		<b>Art Unit</b>	
	James M. Mitchell		2813	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,6-9,11,12,14,16-20 and 33-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-9,11,12,14,16-20 and 33-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

This office action is in response to applicant's request for continued examination filed July 11, 2006.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-9, 11, 12, 14, 16-20 and 33-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amagai (U.S. 6,23,661)<sup>1</sup> in combination with Forray (U.S. 2002/0062923).

Amagai (Fig.3) discloses:

(cl.1) a semiconductor device assembly comprising: a solder mask (8) over a substrate (3), a die (2), conductive paths (5) connecting contacts on said die with contacts (4) in said substrate (via within perimeter portion of substrate) and a adhesive layer (e.g.

above 8 not labeled)) between said die and said solder mask;

(cl. 3) an encapsulant (9) over the assembly;

(cl.38) subsequent processing is wirebonding (5);

(cl. 41, 46) wherein said adhesive contacts mutually facing surfaces of said die and said solder mask (Fig. 3).

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<sup>1</sup> Likewise any one of the newly cited art could have been used to provide basis for an obvious type rejection, since they show generally the claimed invention comprising a chip mounted on a soldermask over a substrate with an adhesive.

With respect to claims 2, 6-11, 14, 16-20, 33-36, 39, 40, 42-45 and 47-50, Amagai does not appear to disclose process limitations as exemplified by a partially-cured adhesive layer that is at least 50% partially cured at a temperature below about 100 degree Celsius, the adhesive is a resin bismaleimide with a glassy temperature about 20-50 degrees with initiators which react at a temperature below about 100 degree Celsius, an encapsulant molded over the die or that said contacts are substantially free of contaminants outgassed from said solder mask, or that the partially cured adhesive has an adhesive strength sufficient to hold a die to a solder mask during subsequent package assembly processing that includes wirebonding, or that the adhesive is more impervious to affects of outgassing or is cross-linked.

However, Forray utilizes an adhesive with a glassy temperature between 20 to 50 degrees Celsius via a resin bismaleimide and further discloses a bismaleimide partially cured adhesive (e.g. at point where material begins to cure there's a portion that's not cured; Par. 0065, Table) with a semiconductor device that remains voidless after outgassing<sup>2</sup> (Abstract: "reduced void formation upon *curing*"; Paragraph 0048) and therefore adhesive is more impervious to affects of outgassing (e.g. zero voids discloses in table; Par. 0065, paste F), and is at least partially cured at a temperature below 100 degrees, i.e. fully curable at a temperature below about 100 degree Celsius (Par. 0007, Lines 6-8; Par. 0065 Table) whereby said partially cured is further cured at a temperature about 100 (Par. 0065, Table Paste F; cure peak is 99.16) and therefore

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<sup>2</sup> Applicant's claim 45 only defines a natural phenomenon with outgassing (e.g. voids that trap moisture), but do not impart patentability, since patentability of a product is imparted by its structure. In this instance, since the claim and its independent claims broadly encompass an adhesive with no voids, further

Art Unit: 2813

crosslinked, wherein the adhesive is inherently cured at a temperature between 20 to 50 degrees higher than glassy temperature ( $T_g$ ) of said adhesive layer (admittedly by applicant, Page 6, bismaleimide  $T_g$  is 5-10 degree Celsius); and said adhesive contains an initiators (Par. 0028, Lines 9-10) which reacts at a temperature about 100 degree Celsius, and has an adhesive strength sufficient to hold a die to a solder mask (i.e. no additional adhesive is used) during subsequent package assembly processing (Par. 0065, Table; i.e. the heating process between the onset cure temperature and cure peak is a subsequent package assembly process) that includes wirebonding (Par. 0065, Table; i.e. adhesive subject to a 50% cure between onset cure and cure peak **[Specific percentage defined by applicant's Spec. Page 7 that sufficient to enable package processing]**).

It would have been obvious to one of ordinary skill in the art to form the adhesive of Amagai with the adhesive of Forray and its characteristics, in order to bond the chip and to eliminate void formation in the adhesive during a cure process as taught by Forray (Abstract; Par. 0047-0049) thereby providing contacts free from contaminants (via limited outgassing because no voids formed in adhesive)<sup>3</sup>.

With respect to the process limitation of claims 1-3, 6-9, 11-20 and 33-37, and 40 as exemplified by "molded" or "subsequent processing" are product by process claims. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself, the prior art structure is the

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providing disadvantageous of outgassing does not add structural limitations, and therefore does not impart patentability.

<sup>3</sup> In addition, the selection of a known material based on its suitability for its intended use supported a

Art Unit: 2813

same as the claimed invention. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

Furthermore, with respect to claims 1 and 12, the intended use limitation of "adhesive strength sufficient to hold said die to solder mask during subsequent package assembly processing [wirebonding]," does not result in a structural difference between the claimed apparatus and the apparatus of the prior art. Further, because the apparatus of the prior art, Forray, is inherently capable of being used for the intended use the statement of intended use does not patentably distinguish the claimed apparatus from the apparatus of prior art. Similarly, the manner in which an apparatus operates is not germane to the issue of patentability of the apparatus; Ex parte Wikdahl 10 USPQ 2d 1546, 1548 (BPAI 1989); Ex parte McCullough 7 USPQ 2d 1889, 1891 (BPAI 1988); In re Finsterwalder 168 USPQ 530 (CCPA 1971); In re Casey 152 USPQ 235, 238 (CCPA 1967). Also, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim."; Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). And, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims

Art Unit: 2813

cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

In addition, with respect to the choice of materials,

### ***Response to Arguments***

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection. However in an effort to expedite prosecution of this application, examiner has addressed arguments that still be relevant. Examiner has re-incorporated Amagai as applied in the rejection filed October 14, 2005. Upon its initial use, applicant contended that the combination disclosed with Forray did not disclose the claimed invention, because Amagai showed the chip attached to the solder mask with an adhesive tape, not a partially cured adhesive. After further review of the prior art, examiner disagrees, because Amagai explicitly discloses that its adhesive portion may be a B –stage (Col. 6, Lines 43-45). In addition, applicant contended that forming the adhesive of Amagai from bismaleimide resin would result in a list to the three layer tape of Amagai. Examiner respectfully disagrees. The intermediate layer of Amagai's tape provides the solder mask with only one adhesive connecting the chip to the soldermask. Since Amagai provides that its adhesive may be other materials ("it is possible to use...etc"; Col. 6, Lines 43-44), it contemplates for example an adhesive like bismaleimide without destroying the three layer tape configuration as alleged. Furthermore, since applicant's contentions are tantamount to



Art Unit: 2813

mere conjecture, absent extrinsic evidence to the contrary, examiner is unpersuaded.

See M.P.E.P 2145[R-3].


### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. the prior art shows the common use of attaching a chip to a substrate covered with a solder mask by an adhesive

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

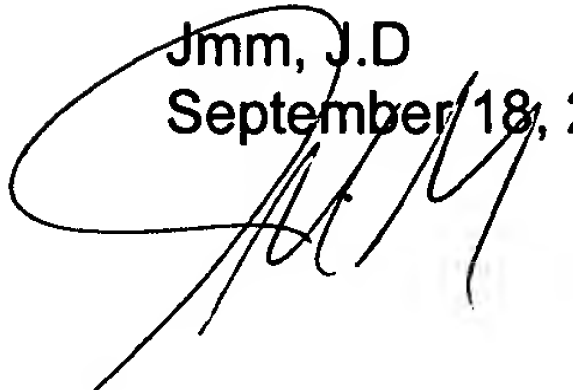
  
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Application/Control Number: 09/484,437  
Art Unit: 2813

Page 8

Jmm, J.D  
September 18, 2006

A handwritten signature in black ink, appearing to be 'Jmm', is written over the typed name and date.